Safety and Buildings Division Summary of Rules for Water Heaters Used for Space Heating - 4/13/2010

The Uniform Dwelling Code (UDC), Comm 20-25, applies to only one- and two-family dwellings built since 1980. The Wisconsin Commercial Building Code, Comm 61-66 and the Wisconsin-amended 2006 International Mechanical Code, International Energy Conservation Code, and International Fuel gas Code apply only to commercial and multi-family dwellings. The Wisconsin Plumbing Code, Comm 81-87, applies to all buildings. Note the code from which a requirement arises and to what buildings it therefore applies.

- **Wisconsin Boiler Code:** Comm 41.45(1) of this code exempts water heaters from the boiler code.

- **Listing:** Per Comm 23.04 and IFGC 631, heating equipment shall be listed and installed per its listing. Water heaters used for space heating need to be listed for such use and their data plate shall indicate that the unit can be used for simultaneous space heating. IFGC 624 specifies that they be listed per ANSI Z21.10.1 or ANSI Z21.10.3. These standards are intended for dual use, which means that in addition to the heating use, it shall also be used for potable use, which may be satisfied with at least one properly-connected plumbing appliance or fixture. (A hose bibb is considered a fixture.)

- **Unlisted Space-Heating Only Equipment:** Space-heating only usage would be considered an unlisted use of a water heater, listed per ANSI Z21.10.1 or ANSI Z21.10.3 for dual-use. IFGC 65.0301(2) for gas-fired appliances and Comm 64.0301(3) for other fuels allow unlisted equipment if a Wisconsin-registered engineer or architect tests the appliance output and safety controls to these or other appropriate standards as determined by the manufacturer. This may be done for each installation or the manufacturer may obtain a Wisconsin Material Approval for repetitive installations. These Material Approvals may also be valid under the UDC.

- **Efficiency:** Federal appliance efficiency standards have superseded Wisconsin's efficiency requirements for smaller appliances for which there are federal standards. The federal government requires that a manufacturer meet the standard applicable for the type of appliance for which they market an appliance. There is a federal standard for potable water heaters. There is a federal standard for boilers, which would apply to water heaters used for space heating only. There is **no** state or local responsibility or authority to enforce the federal rules.

- **Sizing:** Per Comm 23.04(5), Comm 64.1001, IFGC 624 for gas appliances, and Comm 82.40(5)(a), a dual-use water heater shall be sized to provide sufficient hot water to supply both the daily and hourly peak loads of the building.

- **Plumbing Code:** Any equipment or piping that comes in contact with potable water must meet the potable water plumbing materials standards. (A Wisconsin Plumbing Products Approval is not required.) The installation of the system that comes in contact with the potable water system must be installed by a properly-credentialed plumber. All water heater relief valves which are designed to discharge water or steam shall be connected to a discharge pipe. The discharge pipe shall be installed to drain by gravity flow to a floor served by a floor drain or to a receptor in accordance

with Comm 82.33(8). The discharge pipe for a water heater shall terminate within the same room or enclosure within which the water heater or hot water storage tank is located. If a heat exchanger is used and only non-toxic grade additives are used, it may be a single-wall heat exchanger. If toxic additives are used, then the heat exchanger shall be a vented, double-wall heat exchanger as required by Comm 82.41(3)(d). The valving and safety devices on the system must comply with the Plumbing Code.

- **Non-potable piping:** If the listing, engineer/architect statement, or Wisconsin Material Approval permits the installation of backflow prevention at the water heater inlet or isolation of the water heater, then non-potable piping and devices may be used. Non-potable, heat distribution piping shall comply with IMC 12.

- **Backflow Protection:** If any form of backflow protection is installed between the water service and the water heater, the buildings water system is no longer available for expansion of the heated water. If the backflow protection device is installed, an alternate form of expansion shall be provided. The alternate expansion form shall be installed per the water heater's listing.

- **Temperature Setting:** Per s. 704.06 of the Wisconsin statutes, a residential landlord shall set the potable water heater temperature no higher than 125 degrees F. Per Comm 81.01(126) of the Plumbing Code, the minimum water temperature for hot potable water is 110 degrees F.

- **Isolated Water Heaters:** If a water heater is installed with no connection to the potable water system, then typically, proper water expansion means shall be provided per the water heater's listing.

- **Pipe Insulation** - Per Comm 22.44, heating pipes shall be insulated to a minimum of R-4. IECC 403.3 and 403.4 requires mechanical system piping capable of carrying fluids above 105 degrees For below 55 degrees F, as well as all circulating service hot water piping in low rise residential buildings with three tenants or more to be insulated to a minimum of R-2. IECC 503.2.8 defines minimum insulation requirements for all piping serving as part of a heating or cooling system in commercial buildings, or high rise residential buildings four stories or more above grade with three tenants or more. IECC 504.4 defines minimum insulation requirements for automatic circulating hot water systems installed in commercial buildings or high rise residential buildings four stories or more above grade.
- **Combustion Air** – Combustion air shall be provided per Comm 23.06, IFGC 304 for gas fired appliances, or IMC 701 for all other fuels.

If you have further questions, contact your local building inspector or the Safety and Buildings Division Plumbing Consultant for your area, http://commerce.wi.gov/SB/SB-PlumbingConsultantsMap.html.